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# DISEASES

OF THE

# CHEST

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*"The most important factor in diagnosis in  
the majority of cases of pulmonary tuberculosis  
is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

**Season's Greetings** THE EDITORIAL Board of DISEASES OF THE CHEST extends

the Season's Greetings to all of our readers. We have resolved to continue what we believe an intelligent fight against tuberculosis. We feel that by emphasizing especially, early diagnosis and the segregation of the open case, much can be accomplished. We have resolved to present in the pages of DISEASES OF THE CHEST, such simple readable articles by distinguished Tuberculosis Specialists that will be helpful to all physicians in the practice of medicine.

We have also resolved to concentrate our efforts in the campaign against tuberculosis by offering such messages through the pages of this journal that will tend to keep the busy bed-side physician "Tuberculosis Minded". It is our opinion that many more cases of tuberculosis will be discovered early if our messages are put before the profession at large with an appeal for their co-operation in the effort to absolutely control the tuberculosis situation.

The Editorial Board welcomes at all times suggestions, case reports, articles and queries. Your Board needs your help in making DISEASES OF THE CHEST useful in its intended field.

C. M. H.

**Taking Stock** IT IS customary for most concerns to take stock at the end of each year; it is also a good

custom for organizations to follow suit. Members of organizations should also take stock of their accomplishments and what their efforts have produced.

The Federation of American Sanatoria has been in existence about a year and a half. We now quote from the record:

1. During this short period, more than 200,000 copies of its official publication, "DISEASES OF THE CHEST" have reached into physicians' offices throughout the United States and into many foreign countries.

2. A "Pneumothorax Directory", the first of its kind ever published, has been compiled and released. Plans have been effected to publish a revised edition of this directory annually.

3. The Statistical Committee of the F. A. S. is now in the midst of compiling a report on the percentage of patients in the various sanatoria, who are receiving some form of collapse; the number of patients who are awaiting hospitalization, the number of beds available for patients, along with other pertinent information. To-date, this information has been received from 326 sanatoria in the United States.

4. The Statistical Committee has also prepared a questionnaire which will be sent to all recognized medical schools, in order to ascertain the number of hours devoted to and the methods used in the teaching of diseases of the lungs to the

junior and senior students of those schools. It is our plan to have all recognized medical schools adopt a uniform curricula for the teaching of this subject. There is room for much improvement in this direction.

5. A program on the various aspects of chest diseases was presented last year, at the meeting of the American Medical Association. This program was designed to appeal to the physician in the general practice of medicine. It is planned to repeat a similar program at the Atlantic City meeting of the A. M. A., in June of this year.

6. The Editorial Board of DISEASES OF THE CHEST has carried forward its campaign for the early diagnosis of chest diseases and for the isolation of the open case of tuberculosis, directed to the physician in the general practice of medicine. This campaign will be continued during this year and an interesting program of papers on various phases of chest diseases, and allied subjects will appear each month in the journal. These papers will be contributed by recognized authorities in their respective fields.

These accomplishments, are such that any organization may well be proud of. However, we cannot and must not rest upon past laurels. We must forge ahead to greater accomplishments during the year which is now unfolding itself before us. Therefore, let each of us resolve to do our part, to carry forward the work so ably started.

M. K.

**Case Finding** WE HAVE always maintained that the role of the private physician in case finding is most important. Recently, a report by Dr. Bruce Douglas and Dr. John H. Handlin of Detroit revealed that in Detroit the cases of tuberculosis on record for 1935 number 9,388 in all stages of the disease. Of the 4,490 adult type 63 7/10 per cent were reported by private physicians, however, only 13 5/10 per cent minimal cases were reported by private physicians. The city physicians reported 15 2/10 per cent of the minimal cases and school surveys

revealed 30 8/10 per cent of the minimal cases.

It is easy to explain why the private physician finds more moderately advanced and far advanced cases than other agencies, as the majority of cases he sees are really ill. The early case, with very mild, or no symptoms, rarely consults the private physician. If the private physician would become more interested in seeking contacts among cases of those he discovers and by the use of the tuberculin test and the x-ray, he could uncover many more cases in the early stages. If all of his contacts were studied systematically, he could easily reduce the number of advanced cases in his findings. Since the private physician is the chief source of new cases reports, he should be encouraged more and more.

The service required in making surveys of minimal cases has not been done in the majority of instances because the service could not be paid for, and arrangements have not been made, to date, for such services. We are happy to quote here a very healthy attitude revealed in the Bulletin of the National Tuberculosis Ass'n. of December, 1936 which is as follows:

"Since the private physician sees so many cases it is suggested as a practical control measure, he be encouraged in his case findings, both as to method and by financial assistance in the form of fees, to be privately paid when possible, or publically when the patients' circumstance warrants." This method is far better than taking from him the large volume he already does and replacing his efforts with those of other agencies.

**Membership Campaign** THE MEMBERSHIP campaign of the F. A. S. started off with a bang. The enrollment of members for 1937 shows a twentyfive per cent increase over the same period last year. If you desire to receive a listing in the 1937 "Pneumothorax Directory" send your application in at once. If you do not have an application form, we will be pleased to mail one to you.

R. B. H., JR.



## President's New Year Message

The *New Year* edition of *Diseases of the Chest* comes to you today with a message of increased hope. The past year has been one of hard work on the part of your officers and committees.

The Membership Committee has divided the United States into thirteen districts with one of the committee in charge of each district. Today our membership reaches 207, as recorded in our 1936 Pneumothorax Directory. This is a big increase over last year.

It is our hope that the coming year will find the entire staff of tuberculosis physicians linked together in a stronger working plan to bring to the general practitioner the importance of *early diagnosis* of tuberculosis. I feel this is the basic principle in the fight against the disease.

Too much stress has been placed on the findings of the stethoscope. In many cases the physical findings are very few or may be absent. In these the physician and patient are lulled into a sense of false security by the statement of the physician—"I cannot find anything wrong." The time has come for us to outline an easier method. The grouped experience of many men has placed in our hands several factors which, if carried out, will eliminate guess-work to a very great extent. In the first place it is important to talk things over with your patient. Find out how long he has been feeling bad. Ask him how long he has been tired; how long he has had a cough; how much weight he has lost; whether he runs an afternoon temperature and then just ask yourself, "Have I had several *sputum tests* made? Have I had him *x-rayed*?" If you have not, then ask yourself why you have not had a sputum test made and an x-ray taken. Much future trouble and sorrow will be avoided if you do these things for all suspicious cases.

Next year I shall not be your President, but if I can be instrumental in impressing on each of the members of the *Federation of American Sanatoria* these few facts and if you will carry this message to your county and state societies, the *Federation of American Sanatoria* will have done its share and will have justified my faith in its existence.

I hope we shall have a large attendance at the Atlantic City meeting. Bring with you any ideas you have for any plan to enlarge or better the work of the *Federation of American Sanatoria*.

WILLIAM DEVITT, M.D.,  
President,  
*Federation of American Sanatoria.*



## Hypothesis on the Active Treatment of Pulmonary Tuberculosis\*

THE ACTIVE treatment of tuberculosis can be attempted along lines of Endocrine Therapy. This includes Thyroid, Adrenal, or the required combination of the ductless gland substances.

When the thyroid, derived from tuberculous cases, is examined histologically, the changes are those of sclerosis, as a rule—the direct antithesis of those found in Graves' disease. It is not generally appreciated, but it is a fact, that in patients with symptoms of hyperthyroidism, tuberculosis, when it does occur, runs a very mild course; in many the abortive type of the disease is to be seen. In cases in which the differential diagnosis between hyperthyroidism and phthisis has to be made, we are often actually dealing with the co-existence of the two diseases, but the lung lesion is so mild, the patient recovering, and remaining with the thyroid dysfunction, that we are apt to conclude that the suspicion of phthisis was not justified. In progressive phthisis we may note symptoms of hyperthyroidism in the incipient stage but with the advance of the tuberculous disease they disappear. They may also disappear when the lung lesion improves, or when the patient is cured of his tuberculosis. The transitory character of the hyperthyroid symptoms, disappearing with the aggravation as well as with the improvement of the tuberculous process, is rather suggestive. It appears that the tuberculous toxin stimulates the thyroid at first but when the stimulation keeps on for a considerable time it is effective in producing sclerosis of the gland, and for this reason we find sclerosis of the thyroid in many, many fatal cases of tuberculosis. Moreover, hyperthyroidism is often found in youthful tuberculous patients, in ad-

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lescents, in young girls in whom menstrual disturbances—dysmenorrhea, amenorrhea, etc.,—are the clinical features of the

The mildness of tuberculosis in hyperthyroid individuals was observed fifty years ago by Hamburger, and Morin noted long ago that in tuberculous families the members who have large thyroids escape, and when infected, recover. S. Solis Cohen stated as far back as 1887 that a large thyroid is characteristic of immune members of tuberculous families. Greenfield could not find tuberculous lesions in any of the fatal cases of Graves' disease that came under his observation. Similar experiences have been reported by Sloan, and Gerald Webb, and many others have had the same experience. In Webb's experience and opinion, "The increase in the size and function of the thyroid is a phase in marshalling of the body's defensive force against the invading disease." Webb quotes Plummer of the Mayo Clinic, where large numbers of cases of exophthalmic goiter are treated, to the effect that tuberculosis is much more rare in persons with this disease than in others. Hypothyroid individuals, on the other hand, very frequently suffer from active and progressive tuberculosis of the lungs. In fact, in thyroid families some children are myxedematous, or cretins, while others are tuberculous. W. S. Greenfield speaks of "the great tendency of myxedema to tuberculosis. Of course, it may occur in Graves' disease but as far as I can judge there is no special tendency to it. In myxedema it is especially frequent." In five out of seven fatal cases of myxedema, tuberculosis of the lungs was found at autopsy; while in none of the cases of Graves' disease was tuberculosis found.

Symptoms and signs of hypothyroidism are very often noted in far advanced cases of tuberculosis. Experimentally, it has

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been repeatedly found that thyroidectomized animals show a diminished resistance to tuberculous infection. Hoffman considers the thyroid a special means of defense of the organism against tuberculosis, and hyperplasia of the gland a protective mechanism. He particularly warns against operating on the thyroid without considering the possibility of tuberculosis following thyroidectomy. It has been suggested that the thyroid is probably exerting its influence in this direction through its stabilizing action on calcium metabolism. There is considerable evidence to the effect that thyroidectomized animals show a greatly diminished resistance to tuberculous infection.

In a very large proportion of cases of pulmonary tuberculosis there are to be seen symptoms pointing to dysfunction of the adrenals—Low blood pressure, as well as weakness and lack of endurance, myasthenia, pigmentation of the skin, etc., have been attributed to hypofunction of the adrenals. The great frequency with which these glands are found affected by tuberculosis in cases of phthisis, favors the view that this is due to insufficiency of the adrenals. Many writers have seen a correlation between the excessive function of the thyroid in incipient tuberculosis and the insufficiency of the adrenals. It is noteworthy that while in nearly ninety per cent of Addison's disease tuberculous changes are found in the adrenals, active tuberculosis of the lungs is very rare in this disease; most of the lung lesions found at autopsy are of the sclerotic type. In fact, tuberculous lesions in the lungs found in many cases of Addison's disease are almost invariably of slight extent and healed. Cases showing the symptoms of hyperthyroidism, in incipient tuberculosis, would be given adrenal therapy, and the chronic cases where the hyperthyroidism is lacking would be given a combination of thyroid and adrenal substance. The latter type of case would receive both thyroid and adrenal substance because it has been clearly shown that there is a sclerosis of the thyroid in tuberculosis with hypothyroidism,

and feeding the tuberculosis patient the internal secretion of the thyroid stimulates the adrenal medulla. The increase of adrenalin so caused provokes the liver and other cells to discharge their glycogen into the blood as glucose and the elevation of the blood sugar thus produced stimulates the islands of Langerhans in the pancreas to secrete insulin. This, in turn, facilitates carbohydrate metabolism and affects the nutrition and activity of most of the tissues and organs of the body.

Modes of reinfection in human beings under the following captions present facts that are very important points on phthisiogenesis:

- (a) Reinfection in sanatoriums and hospitals for consumptives.
- (b) Tuberculous disease in medical students, physicians and nurses.
- (c) Marital phthisis.

It may be noted also that tuberculous infection can only occur once, and that phthisis develops only in persons who are, for one reason or another, constitutionally predisposed to the disease.

In as much as the non-phthisical consort has already been infected with tubercle bacilli during childhood, new opportunities for reinfection by cohabitation with a consumptive are of no avail to produce phthisis. It is his or her constitution that determines whether consumption will develop and not the opportunity for reinfection. I wish to state that the constitutional predisposition spoken of so often, in my estimation, has its foundation in the condition of the endocrine system. The integrity of this system prevents tuberculous disease, and impairment or dysfunction precipitates tuberculous disease.

The process of resistance remains obscure; and immunity is apparently always relative. It appears clear that the circulating antibodies—bacterio lysins, anti-toxins, precipitins, agglutinins, opsonins, etc.,—play little or no part in the struggle of the body against the invading tubercle bacilli. It would, therefore, seem that humoral mechanisms are not of primary significance in tuberculous immunity, but,

rather, that the fixed tissue cells bear the brunt of the struggle; consequently the resistance manifested by the human body may depend entirely upon the normality and integrity of the endocrine system.

Further proof that an unbalanced endocrine system predisposes to adult tuberculosis is borne out by the following: During the years when most of the human infections take place, between the second and the fourteenth, the mortality from all forms of tuberculous disease is comparatively low; then, at the age of fifteen, there is another increase in the death rate which keeps on rising so that from the twentieth year onward the maximum has been reached, keeping up until advanced age.

On the other hand, when the ductless glands are presumably functioning normally (up to puberty, or adolescence) the predominant type of tuberculosis is glandular. This would lead one to believe that the ductless glands have a controlling influence over the lymphatic system. It is only after puberty as a rule that this bodily co-ordination is lost and phthisis develops. Why should the child have relative immunity and the adolescent lose it; and why should one of every seven to ten people die of pulmonary tuberculosis, if immunity, which was supposed to have been attained during childhood, plays a major part? It is true that healed tuberculous lesions have been found to contain viable and at times virulent tubercle bacilli and the fact that this is the case in clinically arrested tuberculosis would certainly contradict the idea of immunity per se.

We cannot consider these patients "carriers" in the true sense of the word because they can be re-infected by the same micro-organisms autogenously, whereas, in true "carriers," the organism can infect others but not the same person. Therefore, if nature herself cannot guarantee a natural cure, how can the

medical profession hope to obtain it through induced immunity? The experimental work and research done along immunological lines since discovery of the tubercle bacillus by Koch in 1882 are, I believe, in vain.

The following are some of the causative factors of endocrine insufficiency, predisposing to the development of active tuberculosis: Acute infectious diseases, puberty, influenza, syphilis, and congenital weakness of the ductless glandular system, so that a not-well-definable deleterious agent brings this system to degeneration. *Active tuberculous infection* itself must also be emphasized as a causative factor.

Speaking of the suprarenals, Elsasser found, among five hundred and forty-nine cases from literature, isolated tuberculosis of the suprarenals in seventeen per cent; in forty-eight per cent there was combination with pulmonary tuberculosis; and in the rest of the cases tuberculous foci in other parts of the body.

My theory infers that in sixty-five per cent of the above mentioned group the adrenals were involved with tuberculous lesions secondary to the initial ductless gland sclerosis, and in the remainder, while no microscopic examination was reported, a sclerosis probably existed which was no doubt primary. In four hundred and seventy-two cases the lesions of the suprarenal were bilateral. We must, therefore, turn our attention to a new method in the treatment of tuberculosis—endocrinology and endocrine therapy—if the above facts are to receive the proper consideration that they so justly deserve.

The text books on Pulmonary Tuberculosis (Fishberg) and Endocrinology (Falda, Meyers) have been freely consulted and appreciation is hereby acknowledged.

NOTE: The second part of this paper will be published in the February issue.

## Surgical Collapse of the Lung

MOST OFTEN one interested in thoracic surgery is called upon to talk to men interested in general surgery, and it is with extreme pleasure that I accept this invitation and opportunity to exchange opinions on the treatment of pulmonary tuberculosis, and especially with regard to its surgical treatment.

Functional rest of the lung, as a result of body and postural rest, is admittedly the most important factor in the modern sanatorium treatment of pulmonary tuberculosis. It is quite sufficient to bring about recovery in a large proportion of cases in the early stage, and in some moderately advanced cases, provided it is possible, and provided that the patient can be persuaded to continue the rest cure sufficiently long. When the disease has advanced, however, to more extensive infiltration with cavity formation, healing may take place as a result of prolonged bed rest, but in a vast majority of cases the disease progresses and invades the opposite lung, the intestines, or the larynx, and, sooner or later, the condition becomes hopeless. Hence it is generally recognized by physio-therapists that something beyond routine sanatorium care must be given.

In a majority of cases, when a tuberculous infiltration is present to more than a minimal extent, and when the patient has a positive sputum, the failure of bed rest to bring about the desired results in the large proportion of even moderately advanced cases, particularly those with cavity formations, has forced the development of other methods of bringing about recovery.

Since Koch's dramatic announcement of the discovery of tuberculin in 1890 we have observed, with scarcely less disappointment, the failure of numerous other cures for tuberculosis, such as Maragliano's serum, Friedman's turtle serum,

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Dryus vaccine, Moolgard's sanocrysin, Brothers' tricotyl, and so forth. The failure of all efforts to find some specific, curative serum, vaccine or chemotherapeutic has, more and more, directed attention to the development of methods for giving added rest to the lung and closing offending cavities by surgical, or at least, by some operative procedure. Bacteriology as a baby promised much in medicine. It has proven a most distressing failure in most fields and especially in the treatment of pulmonary tuberculosis.

As young a field as thoracic surgery is, it is still a massive field to cover in the treatment of pulmonary tuberculosis. The purpose of this paper is to relate our own personal experiences with the use of various methods of lung closure. While numerous surgical procedures have been proposed from time to time in the treatment of pulmonary tuberculosis, only those which have proved of value are included under the term "operative collapse therapy," and which have for their objective function rest of the lung and closure of cavities obtained in mechanical ways through collapse of the lung.

Operative collapse therapy is, unquestionably, the only real contribution to the treatment of pulmonary tuberculosis since Detweiler advocated the principles of rest and conservation of vital energy sixty years ago. Today, to be even moderately successful in the treatment of pulmonary tuberculosis with cavitation, an internist, surgically minded, and a Roentgenologist with ability to localize and describe existing pulmonary pathology, are most important. Only by recognizing the ability of each separate man and weighing his opinion, can some of the disasters previously encountered in collapse therapy be avoided.

Operative collapse therapy includes many operative procedures for putting

the lung at rest and closing the tuberculous cavities; however, only four procedures have passed beyond the developmental stages and have been generally accepted as of established value; namely, artificial pneumothorax and its adjunct, intra-pleural pneumolysis, phrenic neurectomy, and extra-pleural thoracoplasty. Three other procedures, apicectomy, drainage of the tuberculous cavities, and paraffine plumbage, are of value in a few selected cases.

*Pneumothorax.*

Pneumothorax, of all operative collapse procedures, has proved most widely applicable and the most valuable. This procedure was first noticed accidentally in the Napoleonic wars; for here it was observed that tuberculous conscripted cases who were shot through the chest and recovered from their initial shock, showed marked improvement in their pulmonary tuberculosis following traumatic spontaneous pneumothorax. Carson, almost one hundred years ago, first suggested the possibility of the use of artificial pneumothorax as treatment for pulmonary tuberculosis.

The technique will not be discussed, because it is pretty well standardized. I should mention, however, that by employing carbon dioxide instead of air for primary inflations, the danger of gas entering the pulmonary circulation and causing cerebral gas embolism is greatly lessened, because carbon dioxide combines very quickly with the blood stream. Generally speaking, small quantities of gas, from 150 to 350 cc., should be used every few days for the first few weeks, while a careful check is made of the degree of collapse by the fluoroscopic screen, or by means of Roentgen film.

*Indications for Pneumothorax.*

Artificial pneumothorax should be utilized much earlier than is now customary. The indications vary within the widest limits, and every case presents a problem

for the physician to solve on the basis of his experience with the usual regime and pneumothorax therapy. If, after reasonable sanatorium care, that is, three to four months, a case still has positive sputum, even though the lung involvement seems to be minimal in extent, pneumothorax should be considered. The treatment should be used before destructive lesions are established, or pleuritis forms adhesions with consequent unsatisfactory collapse of the lung.

Hemoptysis, whether slight or severe, is an obligatory indication for artificial pneumothorax, as soon as the site of bleeding can be established and the contralateral side has been cleared of infected blood.

Tuberculous spontaneous pneumothorax should be converted into a controlled artificial pneumothorax.

Tuberculous pleurisy with effusion should be treated by replacing the fluid with air and an artificial pneumothorax maintained according to the indications of the underlying disease.

Ten years ago Dr. Matson, of the Portland Open Air Sanatorium, reviewed the end results of six hundred cases of pulmonary tuberculosis subjected to pneumothorax treatment during the previous twelve years, with the following results:

Of those cases in which pleuritic adhesions did not prevent satisfactory closure of the cavities or adequate functional rest of the lung, 48 per cent made clinical recovery; 18 per cent were arrested; 12 per cent were improved or unimproved; and 22 per cent were dead. In a second group of cases where adhesions did prevent adequate functional rest or satisfactory closure of the cavities, 11 per cent were clinically well; 12 per cent were arrested; 19 per cent were either improved or unimproved, and 58 per cent were dead.

Thus, we see that adhesions in the chest, preventing efficient collapse of the lung, increase the mortality rate approximately 300 per cent. In this series also were 120 cases used as controls. A pneumothorax was indicated in these cases, but no gas could be introduced because no fre-

pleural space could be found. These patients were subjected to prolonged, *good* sanatorium care. The end results were that five per cent made clinical recoveries; nine per cent became arrested; twenty per cent were improved or unimproved; and 66 per cent were dead. Thus we see the great importance of efficiently and adequately closing offending cavities, and if a partially efficient pneumothorax can be converted to an efficient one, the patient's chances of getting well are increased 300 per cent.

There have been a number of procedures proposed for severance of these adhesions, which, roughly, can be grouped into two large classes: first, open intra-pleural pneumolysis, and second, closed intra-pleural pneumolysis. Competent opinion expresses the belief that any adhesion that can be successfully cut by the open method can, with the newer instruments and electrical coagulation sets, be successfully cauterized by the closed method. The method of choice, whether the two-puncture method, as described in this country by Matson, or the one-puncture method, using the Cutler-Davidson operating thorasciscope, depends upon the training and experience of the operator. The type of adhesion to be cauterized may influence greatly the method of surgical procedure.

Using the one-puncture method and carefully outlining on the chest wall the location of the adhesion and its approximate direction and point of attachment to the chest wall, will enable a large number of supposedly difficult adhesions to become easily accessible. The two-puncture method is preferable for the largest number of cases, because adequate exposure of the adhesion can be obtained through either the anterior or posterior opening. Oliothorax, while having enthusiastic French supporters as excellent therapy for pleural tuberculosis and for maintaining a pneumothorax that threatens to expand unless dangerously high positive pressures are used, has not found the same support among American thoracic surgeons.

One who inspects the pleural cavity through a thorasciscope, after the use of oil of gominol in either a paraffine oil base or an olive oil base, is immediately struck by the marked precipitation of paraffine and oily debris on the pleural surfaces. Inter-thoracic pneumolysis in the presence of an efficient oleothorax presents difficult problems of properly cleaning the adhesive bands before their cauterization.

A cavity, triangular in outline, in a partially efficient pneumothorax almost invariably contains some lung tissue prolonged into the adhesion, whereas if the outline of the cavity is round the adhesion perhaps contains little or no lung tissue. The production of a bronchopleural fistula in the presence of an oleothorax is not an uncommon occurrence.

#### *Phrenic Interruptions*

I have titled this section Phrenic Interruptions because in recent years differences of opinion as to whether the nerve should be temporarily or permanently interrupted have caused confusion as to the proper procedure to follow. Many cases in which a complete exairesis has been done have produced some alarming and distressing symptoms for the patient. In carefully checking our small series of cases we find that most often gastric upsets and abdominal distress have followed complete interruption of the left phrenic nerve. Complete evulsion of the right phrenic nerve will, in a vast majority of cases, give few or no distressing symptoms. Complete evulsion of the left phrenic nerve may be followed by various symptoms more or less distressing in a relatively large proportion of cases somewhat relieved by pneumoperitoneum.

Perhaps, then, we should advocate complete exairesis of the right phrenic with temporary interruption of the left phrenic and if, after a period of six to eight months, diaphragmatic elevation is excellent and improvement has been noticed in the lung, the patient should be subjected to the second surgical procedure

and the nerve completely evulsed. This procedure is justified and perhaps should precede all extra-pleural thoracoplasty.

In a critical analysis of the bibliography of phrenic exairesis, 17 per cent of the cases in which no free pleural space could be found, and in which some collapse procedure was indicated (most often extra-pleural thoracoplasty) made complete, clinical recoveries and the more dangerous and extensive surgical procedures became unnecessary.

### *Plumbage*

Plumbage has made its appearance again and again in thoracic surgery, only to be discarded and again to be taken up with increased enthusiasm as some separate group of surgeons report increasing good results. After the abandonment of fat and muscular plugs, various types of foreign bodies have been tried with greater or less success. A mixture of paraffines with varying melting points have been tried and perhaps this type of plug, with the addition of some heavy metal, ought to produce a most satisfactory compression material. The anterior method of introduction has been practically abandoned, and if the plug is introduced by the posterior method, the procedure takes on practically the same hazards and risks for the patient as does the upper stage of thoracoplasty.

### *Thoracoplasty.*

Next to satisfactory pneumothorax an extra-pleural thoracoplasty is the most valuable procedure for putting a lung at rest and in the state of collapse. This, of course, is accomplished indirectly as a result of removing all or part of the bony framework supporting the adherent visceral and parietal pleura and its underlying diseased lung.

After undergoing many modifications in technique, credit for giving us a surgical procedure of unquestionable value and low mortality in carefully selected cases belongs to Sauerbruch and Brauer. No hard and fast rules should be laid

down as to the number of ribs to be removed at each stage. The condition of the patient, the efficiency of the operating force, the ability of the anaesthetist, the competency of the post-operative nursing,—all should modify the extent of the procedure and the amount of bony tissue removed. It is better to remove smaller portions of ribs posteriorally and later to supplement the posterior stages by an axillary stage than to attempt to remove massive amounts of rib by prolonged and severe traction of the extensor muscles of the back. The question as to when the second, third or fourth stages should be done should be controlled by a careful measuring of the intravenous pressure and by relying on the opinion of the internist as to when the cardio-vascular system has returned to a point as near as possible to the condition before surgery.

While pneumothorax gives the most efficient and complete type of collapse and while extra-pleural thoracoplasty gives the next most efficient type of collapse, sometimes social conditions, the intelligence of the patient, and his willingness to cooperate in a prolonged multiple-puncture procedure, may change the indications from pneumothorax to thoracoplasty. How often have we seen an efficient pneumothorax lost after many months of tedious effort and care, because of ignorance on the part of the patient, or financial inability to prolong his care!

While a strictly medical indication for thoracoplasty may not be present, and where some of the less severe procedures would suffice, thoracoplasty may be indicated because of the social or financial condition of the patient.

While thoracic surgery is a relatively new field, and while, as yet, operative procedures have not been standardized as well as they have been in the abdominal field, certain basic principles have been laid down which will modify the mortality rate and decrease the morbidity of the patient. Crushing of the intercostal nerve is not, at the time of surgery, time consuming and gives relief from post-operative pain. An oxygen tent 24 hours before

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## Tuberculous Empyema

TUBERCULOUS empyema is justly considered one of the most serious complications of pulmonary tuberculosis. While more recent knowledge has improved the outlook for the patient with this condition, the mortality is still generally regarded as anywhere from thirty to seventy per cent.

Tuberculous empyema develops most commonly as a complication of pneumothorax, either induced or spontaneous. It occurs most frequently in connection with the latter condition. It develops occasionally in pulmonary tuberculosis in the absence of pneumothorax.

Tuberculous empyema usually begins as a more or less clear, amber-colored fluid in which, on careful search, especially by culture or by guinea pig inoculation, the tubercle bacillus can be demonstrated. This fluid generally becomes cloudy and later may or may not contain pus as well as mixed infection. The amount of fluid may be small or large. Five or six quarts may be contained in the empyema cavity at a time. The symptoms may be very marked or mild. In the presence of a mixed infection, especially in cases of the acute type, the symptoms are usually marked and the patient is overwhelmed. In other cases, depending on the nature of the infection and the general condition of the patient, the symptoms may be of a degree anywhere between these two extremes.

In the treatment of empyema there is just one point on which there is uniformity of opinion among those familiar with the handling of this condition. That is, that open drainage, the treatment for ordinary empyema, should never be established in tuberculous empyema unless all other measures for the control of the empyema have failed. Open drainage in these cases introduces infection from without and usually leaves the patient with a draining sinus for the rest of his life and its consequent debilitating effects,

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or necessitates extensive mutilating surgery to partially undo the damage. Before an empyema in its earlier stage of treatment is subjected to open drainage it should be made as certain as possible that it is not a tuberculous empyema.

Inasmuch as there is no uniformity of opinion as to the positive treatment of tuberculous empyema, practically everything possible has been tried. These measures have all been found wanting.

There are certain cases that tend to cure spontaneously. These are the cases with a relatively small amount of non-toxic empyema spread out in a more or less thin layer in the pleural space. These may absorb or undergo organization. The milder type, even when the amount of fluid is relatively large, may clear up as the result of simple aspiration. Still other cases will yield to aspiration and irrigation. A few of the more severe cases, especially if they have been neglected, will require surgery, that is, rib resection in varying amounts, either after open drainage or after aspiration. Thoracoplasty also may at times be necessary to eliminate a pleural space caused by a failure of the lung to expand after the empyema has cleared up, or to prevent too great a deviation of the mediastinal contents in the attempt of nature to eliminate such a pleural space. Oleothorax, in the hands of some, has apparently yielded excellent results, while in the hands of others, the results have been very discouraging. This tends to lead one to believe that its use may depend upon the technique and opportunity or ability to control the patient, conditions which often determine the result of any particular line of treatment.

The condition of the underlying lung helps to determine the object sought in treatment. If the condition of the lung is such that it may safely be allowed to expand, the object is to clear up the empyema and bring the lung out. On the

other hand, if the lung must still be kept collapsed, then the object is to not only clear up the empyema, but to continue the collapse of the lung by the pneumothorax, if there was one, or by thoracoplasty.

It is my feeling that by means of the more conservative treatments it is possible to clear up a large proportion of the ordinary empyemas that occur in connection with pulmonary tuberculosis and that, under such circumstances, a great many of the serious complications such as cutaneous and broncho-pleural fistulae and unobiterated pleural spaces with their consequent results would be avoided. The clearing up of any of these serious complications means extensive and radical surgery. Fortunately, however, due to the high degree of efficiency that chest surgery has reached in more recent years, the outlook for patients with these complications has markedly improved. On the other hand, I feel that a like improvement in the so-called conservative treatment would eliminate the necessity for much of this extensive surgery.

In this discussion it is my purpose to call attention to a technique in the conservative treatment which has proved relatively satisfactory in a limited number of the cases of empyema encountered in connection with pulmonary tuberculosis. In presenting this treatment, I am aware that almost countless solutions have been tried in this treatment.

Fifteen years ago, following the report of its use in the English army, I began to instill pure grain alcohol in the pleural cavity after the pus was removed and the cavity repeatedly washed clean with normal salt solution. According to the report, the English used only a dram or two of the alcohol and, although the results were fairly satisfactory with this technique, after two or three years I discontinued the use of alcohol and in its stead used the formalin and glycerine solution according to the Murphy formula, following Dr. Kalb's report in 1922 of his results with this treatment. The formalin and glycerine treatment was relatively satis-

factory as to ultimate results obtained, but the reaction after each treatment was severe. Because of this I returned to the use of alcohol and during the past seven or eight years have employed this treatment almost exclusively in handling these cases.

The original technique of the alcohol treatment has been modified by using a larger amount of the alcohol. I usually use from a half to one ounce at the first treatment, increasing the amount rather rapidly in subsequent treatments, up to three ounces. There is no unpleasant reaction even when the larger amounts of the alcohol are used. At times there may be a slight rise in temperature for a day or two and occasionally, where there seems to be a rather rapid absorption, especially in susceptible individuals, the alcohol produces a tendency to "sleep" for a few hours following the instillation.

The technique employed is as follows: The instruments used are a No. 13 aspirating needle, a piece of ordinary stethoscope tubing about five inches long, a 100 cc. ground glass syringe, a pneumothorax outfit, ordinary pus basins, a hemostat, etc. The patient is placed on a firm table with the involved side up, the field is prepared, the site selected for aspirating is thoroughly anesthetized with novocaine, the needle with the tubing attached is inserted into the empyema cavity and the tubing is then clamped with a fairly large hemostat. The patient then turns completely over so that the good side is up. The hips remain on the original table and the shoulders rest on a small, well padded table which has been placed alongside the head of the original table. The patient is then in such a position that the needle is in the bottom of the empyema cavity and extends directly downward. The lower end of the needle is also free in the triangular space between the two tables, permitting easy access for the operator. If the empyema cavity is so located that it cannot be entered from the axillary region, the position of the patient is changed accordingly, so that the aspirating may be done from the bot-

tom of the cavity, the object being to wash the cavity clean. A pus basin is placed on a low bench directly under the tubing, which is attached to the needle. The hemostat is now removed from the tubing and if the fluid is not too thick or the pressure too negative in the cavity, the fluid will run slowly into the basin. The glass syringe is now attached to the lower end of the rubber tube and the cavity aspirated. While the syringe is being emptied the rubber tube is clamped. Air is injected into the pleural cavity through the fluid by means of the aspirating syringe as it is needed to keep the patient comfortable. Ordinarily, with a needle of this caliber, the pleural cavity can be completely emptied before any of the irrigating solution is introduced. If there is trouble due to flakes, some of the saline can be injected by means of the syringe at any time.

When the original fluid is all out of the pleural cavity, the cavity is repeatedly irrigated until the last washings are clear, using from a pint to a quart or more of the saline. The patient is then turned back onto the original table with the good side up and with the aspirating needle and the rubber tubing in place, the tubing being clamped. The barrel of the aspirating syringe is connected with the tube, the amount of alcohol to be used poured into the syringe, the clamp temporarily removed, and the alcohol allowed to run in or is gently forced in by the plunger of the syringe. The clamp is then replaced and the pneumothorax outfit connected with the rubber tubing. The clamp is removed and the pressure within the pleural cavity regulated. The clamp is again replaced and another smaller syringe is connected with the tubing, and by means of this syringe a small amount of iodine is left in the needle tract as the needle is withdrawn. A firm gauze pack is placed over the needle hole and tightly strapped with several pieces of inch adhesive reaching from the posterior to the anterior midline and the patient instructed to lie as much as possible on the good side for the first few days. The iodine, the firm

strapping, and the position are for the purpose of preventing the possibility of a sinus developing in the needle tract. The strapping is left on for three or four days.

All cases, whether acute or not, that are being aspirated should be kept pretty closely to their beds during the period of treatment. At the beginning, the treatments are repeated at least every week. After several treatments, the period may be gradually lengthened, if the condition warrants. When the fluid becomes serosanguineous and free from infection, the treatment is discontinued.

I have used this treatment both in private practice and in hospital work, but I am including only the results from private practice here because the opportunity for control of the hospital cases was not sufficient. I realize that the number of cases treated is very small, but I am presenting them because I feel that the method of treatment is worth while and deserves further trial. In twenty-two cases the results were as follows:

One case cleared with no treatment.

Five cases cleared with formalin and glycerine treatment.

One case with treatment of formalin and glycerine alone failed to clear.

Nine cases with treatment of alcohol alone cleared.

One case with treatment of alcohol alone did not clear.

Four cases with treatment of formalin and glycerine and alcohol did not clear.

One case with treatment of formalin and glycerine and alcohol cleared.

The four cases which failed to clear with the formalin and glycerine also failed to clear when alcohol was used instead of formalin and glycerine. In the six cases that did not clear, four had either extensive tuberculosis and long-standing, neglected empyemas or a very poor general condition. Two of the earlier cases in good general condition failed to clear. I feel that had they been kept more quiet perhaps they would have had a better chance.

(Continued to page 26)

## Utilization of Southern Sanatoria for Under-Graduate Training\*

THE TUBERCULOSIS sanatorium has come to occupy a unique position among institutions for the care of the sick. Established to exploit an idea of treatment and located, as a rule, in inaccessible places with a view of employing natural therapeutic agents, we have seen it, in comparatively recent times, develop and expand under the impetus of more extensive and accurate knowledge into a modern, well-equipped hospital with complete facilities for all forms of care. We have seen it moved from the mountain and placed at our door, making its benefits available to the many where formerly only a few could profit.

Designed to treat only those slightly ill, its doors now have been opened to all stages of the disease, which has tended to project its usefulness into another domain—that of public health—for the segregation of the infectious types has removed active foci of the disease from the community environment. Already the effect of this "mass infection" removal is being shown in accelerated mortality and morbidity trends.

It is an interesting observation that institutional care of the consumptive in England prior to 1850 brought a rapid decline in the mortality from tuberculosis in the subsequent decades. This was brought about somewhat accidentally.

The fact is that the consumptive in many instances early became a pauper and sought refuge in the almshouse. Thus he was removed from his environment and lessened the number of contacts<sup>1</sup>.

Had the sanatorium done no more than serve as an isolation hospital, removing the communicable cases of the disease from their surroundings, giving these unfortunates comfort and repose in their

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extremity, and teaching the fundamentals of hygiene to those coming under its influence, it would justify its existence.

But much more is being done by the sanatorium. It is teaching the public and the individual patient that tuberculosis is curable and preventable. Was it not its early success in therapy, bringing, as it did, hope and inspiration to a vast host of humanity, which has culminated in the present great movement for the eradication of this dread disease? Within its portals thousands upon thousands of tuberculous sick are being taught the principles of healthful living and personal hygiene, which is contributing measurably to more hopeful prospects for control of this disease.

Furthermore, the sanatorium has developed into a center for research. Many contributions to our knowledge of the bacteriology, pathology, diagnosis and treatment of tuberculosis have originated under its roof.

Perhaps one of its most vital functions is that of an educational institution. It is here that post-graduate instruction is frequently given to physicians and nurses. Our leading specialists in the respiratory diseases have gleaned their most valued experiences there. The sanatorium has been the hub, especially in America, around which have revolved the most effective programs of preventive work.

The properly conducted modern tuberculosis sanatorium has then a threefold value—curative, preventive, educational.

It is this last function to which I would direct attention. It seems to me rather an odd commentary on our methods of medical instruction that in spite of the many years of the sanatorium's existence, in spite of the wealth of clinical material and the availability of able teachers, only

\*President's Address, Southern Sanatorium Association, Hot Springs, Arkansas, October 1st, 1936.

in very recent years have these unparalleled resources been appreciated and utilized for the under-graduate.

Perhaps the failure of deans and professors of medicine to appreciate these opportunities may be due, as Moorman charitably suggested several years ago in his excellent plea for a better place for tuberculosis in the curriculum<sup>2</sup>, to the inaccessibility of the sanatorium to the medical school.

Personally, though, I feel convinced that there was a lack of "intuitive sagacity" in medical pedagogy, if nothing worse.

More than a decade ago Sir Robert Philip, of Edinburgh<sup>3</sup>, said: "In view of the predominant part played by tuberculosis in mortality and disease incidence, and the rapid strides recently made in the elucidation of tuberculosis—clinical, pathological, epidemiological, sociological—there is a clamant need for fuller training of physicians and nurses."

It is generally conceded even today that the graduate in medicine has an "inadequate appreciation of the problems of tuberculosis"<sup>4</sup>. Much blame has been placed on the general practitioner for his failure to diagnose and handle properly cases of the disease coming to him. Might not the blame for this be traced further back? If it is believed he is a vanguard of the forces combatting this disease, should not more aggressive effort have been exerted that he, as a student, might obtain the fundamental facts in the diagnosis and treatment of this disease?

The disease and its problems should not be taught as a specialty, but rather as a part of the course in internal medicine, definitely integrated with the whole clinical program. For, as Moorman has pointed out, "It is impossible to teach tuberculosis without teaching the broad principles of general medicine"<sup>5</sup>. However, I do believe that in order to obtain a comprehensive view of the clinical aspects of the disease, its early and late appearances, its complications, the methods employed for its detection, the varied

courses it pursues and the accepted methods of treatment, it is essential that the student be given these opportunities so abundantly afforded by the sanatorium.

I have no prescribed course to advocate, but were I in a position to do so, I would demand that the student be so taught that in diagnosis he should rely on a careful clinical history and a properly interpreted Roentgenogram in early disease rather than on physical examination (Braeuning has stated that "early pulmonary tuberculosis must be seen and not heard"); that in treatment *rest* is still the sheet-anchor of therapy, but collapse procedure must be constantly kept in mind; that prevention of the disease is the ultimate goal and can be achieved to no small extent by the application of the principles of scientific epidemiology. I would demand that each student be required to have a definite period of sanatorium instruction. These institutions are available all over the country at the present time for this purpose. Thousands of beds are capable of being used, and there is an ample supply of well-trained clinicians whose services could be drafted.

In order to secure information as to whether our Southern sanatoria are being used for this purpose, I sent out a questionnaire to the medical directors of the majority of the institutions within the conference area. Although these data are not complete, they are sufficiently accurate to illustrate the point desired.

In this investigation twenty-eight sanatoria responded to the questionnaire. For the purpose of analysis, these were divided into three groups.

In the first group were placed those sanatoria in which no under-graduate teaching of any kind is done; in the second group those in which some little effort is being made in this direction; and in the third group those in which there is definite evidence that their facilities are being used for this purpose.

The first group consists of 12 sanatoria with a total of 2,380 beds; in the second group there are 8 sanatoria with

1,774 beds; and in the third group there are 8 sanatoria with 2,631 beds.

The teaching in the second group consisted largely in the employment of a small number of medical seniors during the summer months. The sanatorium usually accepted from one to four of these, who, although not given an arranged course, were permitted to do the work ordinarily performed by an interne,—history taking, physical examination, x-ray and laboratory work, and the administration of treatments under supervision.

In the third group there were several located in close proximity to universities and medical schools, which are apparently giving a scheduled, well-regulated course of instruction. In one of these, students are required to spend two weeks in the institution and are given an intensive course of instruction. In another, one week of residence is required. In others, a certain number of hours are arranged for lectures and demonstrations each year. The course, as a rule, was limited to senior students, although in some instances juniors and even sophomores secured some form of tuberculosis instruction. On the whole it would seem that the medical schools in the South are impressed with the need of utilizing sanatoria for clinical purposes, but it would appear that in only a comparatively few could the instruction be deemed adequate. However, it would not be possible to draw a correct conclusion in this regard, because we have no way of estimating the amount of teaching given on this subject in connection with the chest services of the various teaching institutions.

I do not believe that it is possible to standardize any form of teaching; nor am I convinced that, were this possible, it would be advisable to attempt it. However, the importance of education in the fundamentals of chest disease would seem to warrant some minimal standard; and it would seem to me not improper that, even though short, a certain definite period of residence in a tuberculosis sanatorium might be made mandatory.

It will be seen that in the non-teaching

and in the limited-teaching groups of sanatoria, embracing 4,150 beds, little or no value is being derived from an undergraduate educational standpoint. At the same time there are numbers of well qualified and well trained experts in these institutions, whose talents are being neglected and whose services would be a real contribution in making better and more capable medical graduates.

Each year we have approximately 500 junior medical students in our Southern schools, the majority of whom are unoccupied during the summer vacation. Many of them would welcome an opportunity to spend these months gaining practical knowledge and experience about such an important subject as tuberculosis and diseases of the chest. Were it possible to secure this type of training for a large percentage of these young men and women, it would equip them for a better comprehension of the disease and its problems.

This is a task to which the Southern Sanatorium Association might address itself. It seems to me a feasible plan could be worked out and handled by an efficient secretary at a nominal cost, whereby the institution and the student could be brought together to mutual advantage. It would be an opportunity for this Association to render a very valuable service in the making of more efficient, more interested, more tuberculosis-minded general practitioners, the effect of which would be to render added strength to the forces at work for the eradication of this disease.

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## Diagnosis of Early Tuberculosis

KNOWLEDGE of the diagnostic points of pulmonary tuberculosis is so widespread that it seems almost a waste of time to reiterate them. Yet well-known paths are sometimes a little carelessly and thoughtlessly trod. In a disease so destructive of health and life and wasteful of time and money as is tuberculosis, reviewing the early signs which may point to simple and effective and almost preventive treatment may be worth while.

I stress the urgency of careful, complete examinations, reexaminations, and continued observation of individuals who present even one of numerous evidences of tuberculosis.

The first fact of importance is a history of contact. We have recognized that more fully in children than in adults, but it is important also in adults. We often see tuberculous patients who have had no known contact. But that patient who has had definite contact should be regarded with more suspicion and should be more carefully observed than his symptoms may at first seem to warrant.

The history is important too as regards loss of vigor, loss of interest or failure to carry out accustomed activities, unaccustomed tiring, loss of weight, or inability to regain weight after stress or acute illness, loss of appetite or enjoyment of life. These things go with the insidious onset of tuberculosis. Later comes afternoon fever usually in the insidious case. In the more acute onset, fever and night sweats may come first.

More specific symptoms pointing to tuberculosis are pain in the chest and cough. Transient pains may prove to be of no importance, but the physician should at least determine a cause for the pain; whether due to overexertion, costal strain,

BY

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strain, a chronic or acute bronchial and accessory pulmonary infection, true neuralgia due to focal infection, or a more serious condition such as heart disease or malignancy. Possibly the older practitioners were more astute than we in ferreting out the cause of pain. True fibrinous pleurisy always means definite infection in the chest and most often tuberculosis, if pneumonia is ruled out.

Cough may come from a variety of causes, but if the heart is excluded it is usually from the larynx, bronchi, or lungs. I have seen only one actual case of severe paroxysmal night cough in an old man whose uvula, elongated and edematous, actually rested, when relaxed, on the vocal cords. Shortening the uvula relieved the cough, but this cause is very rare. Cough coming first from the larynx is also comparatively rare, except in acute laryngitis which quickly subsides. Primary cough caused by tuberculosis of the larynx also is rare. Polypi and other growths in the larynx are uncommon. I believe also that cough caused by dropping of secretions into the nasopharynx from the sinuses is uncommon and that no cough should be ascribed to this cause without careful demonstration of its existence.

Cough from an acute bronchitis is more common, but if the physician assigns this cause for a patient's cough, reexamination must be made at least monthly for three months to be sure that there is not some underlying more serious etiology.

Cough due to hay fever is not uncommon, but should disappear quickly under appropriate therapy.

Chronic bronchitis and bronchiectasis with or without asthma commonly cause cough. These conditions can be readily differentiated from tuberculosis by lipiodol injections and x-ray film. Occasional

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ly, tuberculosis is diagnosed when examination would show bronchiectasis and, of course, more commonly bronchitis has been diagnosed when the actual condition was tuberculosis.

The raising of sputum always means intrathoracic trouble—bronchitis, bronchiectasis, abscess, tuberculosis, other rare infection, of malignancy. I do not believe that patients raise sputum from the trachea or bronchi because of droppings from the sinuses into the nasopharynx.

Unaccustomed dyspnea on exertion may rarely be a first sign of tuberculosis.

Blood spitting is one symptom that should put a physician definitely on guard. Pyorrhea as a cause of hemoptysis is certainly most uncommon. Varices in the upper air passages, pharynx, or esophagus are also rare. On the other hand, hemoptysis is not uncommon in bronchiectasis. However, this is usually a chronic disease and therefore should not be confused with tuberculosis. Certainly, hemoptysis occurs most commonly in tuberculosis, and tuberculosis should be carefully excluded before diagnosing any other cause for it.

A symptom complex which not infrequently has first brought a tuberculosis patient to the physician is that of so-called "flu" or influenza; occasionally also a diagnosis of pneumonia is first made in this type of patient who some weeks or months or perhaps a year or more later proves to have tuberculosis. Certainly not all so-called "flu" is tuberculosis, but it is also certain that these cases must be observed and reexamined at intervals after their recovery from so-called "flu", if tuberculosis is to be ruled out or discovered at an early stage.

Pleural effusion is another condition that should not be lightly passed over. When no other etiology is present, a large percentage will be due to obscure tuberculosis. Frequently it is wise after aspiration of fluid to cause temporary pneumothorax until the lung can be thoroughly x-rayed and tuberculosis with cavity ruled out. Even when no tuberculosis can

be diagnosed, it still may be present. Recently a young patient of mine with effusion and no demonstrated lung trouble, but in poor general condition, was in bed three months, made marked improvement, and was about to be released when he developed fatal tuberculous meningitis.

Spontaneous pneumothorax rarely is a first sign of tuberculosis. Some cases of spontaneous pneumothorax probably are not tuberculous in origin, but all must be carefully observed and the patients reexamined repeatedly.

Some acute fevers though at first to be due to other conditions prove to be tuberculous.

The average case, however, with which this paper is concerned has only vague symptoms—cough, pain, loss of weight, malaise, and so on.

Examination should be general and thorough. For the chest it includes inspection, palpation, percussion, and auscultation before and after cough. Listening to the chest after cough is of great importance in eliciting signs of early disease. Fluoroscopy is of value.

Most important in this early case is the x-ray film, preferably stereoscopic. I believe that endeavoring to save a patient's money by not having an x-ray film made is often in the end a waste, both of his time and money, and often of his health.

The blood examination is next in order. Anemia should be discovered, if present. The white blood count is of value chiefly for the differential count. A high monocyte count and a relatively low lymphocyte count is somewhat indicative of tuberculous activity. The sedimentation rate, if rapid, will support other positive findings of tuberculosis. Urinalyses and sputum examinations should be made.

Sputum may have to be examined repeatedly and possibly by culture and guinea pig inoculation before being declared negative. Even repeated negative sputum tests do not disprove tuberculosis.

If a positive diagnosis cannot be made, but some of the findings or symptoms point toward tuberculosis, the patient

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should return for reexamination at intervals of a few weeks.

It may be important to make a stool examination, agglutination for malta fever, and other tests to prove that the condition is not something else than tuberculosis.

What harm may we do by failing to make a diagnosis? I cite a case of my own. In 1928 a young single woman stenographer of 22 consulted me because of a hacking morning cough. I was caring for her sister who had advanced tuberculosis and soon died. I knew that this stenographer had been a great deal with her sister and had slept in an adjoining room. The history otherwise was negative. There was no sputum, no loss of weight, no tiring, no apparent fever, no night sweats, no pain. Her general health was excellent. She looked robust. She had palpitation of the heart on excitement. Physical and fluoroscopic examinations were negative. No x-ray picture of the chest was made. Blood pressure was 120/80, the pulse rapid, the pulmonary second sound accentuated over the aortic second sound. Temperature was 98.3. The tonsils were moderately enlarged.

This patient did not return for reexamination, but I saw her frequently at her work and she seemed well. Fifteen months later she saw another physician who found a cavity in the top of the right lung. She later developed a cavity in the left lung. I have seen her in consultation and know that she has been treated by bilateral pneumothorax, that she will never be entirely well and that the cost of her medical care has been close to \$1000.00 at moderate rates. In addition she has lost already about 7 years of normal life.

The course of this case probably indicates a low resistance to tuberculosis, yet had I kept her under observation after my first contact with her I might have saved her loss of time, money, and health. The cost of repeated examinations and x-ray films does not compare with the loss of this girl's health.

Let us start in April, 1936, with the

next case, again a young woman of 22, married, with a child 6 month's of age. She had a dry cough, slight fever, no sputum. Two weeks before, she had spit up a little blood and had pain in the right chest on deep breathing. She had caught colds easily for three years. She had dullness over both lungs and scattered fine rales following cough in the lower right chest in back. Fluoroscopic examination showed marked shading through the right lung and in the upper left. Her hemoglobin was 80 per cent, the sedimentation time 28 minutes, the white count 10,200, lymphocytes 20 per cent, and monocytes 6 per cent. Physical examination alone was sufficient in this case to make a diagnosis of tuberculosis. The x-ray film was corroborative, but showed no cavities of moment. This girl may recover by a prolonged sanatorium regimen without special treatment.

By close questioning, we learned that this girl had spit up blood two years before. She was then an early case of tuberculosis. The physician who saw her made a thorough examination and an x-ray film of the chest. His diagnosis was probable bronchiectasis, but he suspected tuberculosis and advised the patient to return in two months. She did not return. In fact she was so unimpressed with the need of reexamination that she told me her previous examination and x-ray had shown no tuberculosis. I believe she was wrong and that her former physician did caution her. I gain from this incident the impression that we, as physicians must more strongly urge on a suspected tuberculous patient the real danger of not keeping under observation.

This second case may not be out much money because of her failure to avert widespread active tuberculosis, but she will have impaired health the rest of her life.

A more favorable case is that of a young man, single, a chemist, whom I saw in 1926. He also was 22. He had had scarlet fever at 16, measles at 20, and a cough for 6 months with some sputum. About 2 weeks before I saw him he had streaks

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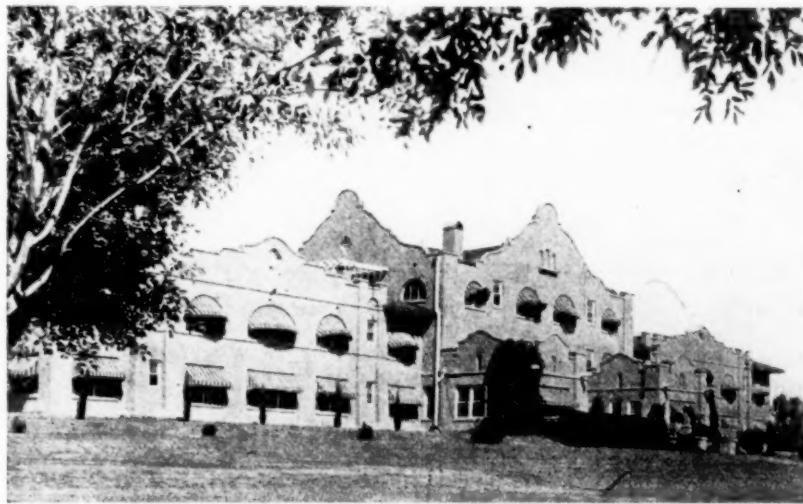
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of blood in the sputum. He had lost 3 or 4 pounds.

Physical examination showed slight depression and impairment of the apices. The x-ray film was reported by Dr. W. W. Watkins as follows: "Radiograph of this chest shows abnormal amount of hilus density about equal on the two sides. There is a moderate fibrous striation density into the upper lobe areas, more marked on the left side over the first, second and third interspaces. The shadows reach well out into the periphery over the upper lobe area of each side but do not have the definite characteristics of parenchymatous activity."

Despite the almost negative physical examination and almost negative chest x-ray this boy's sputum test was positive. It was never positive again. A few months of sanatorium regimen put him back to work and good health.

*Conclusion:* I think it worth while to reiterate what you all know. We need to be reminded to examine our patients thoroughly; we must examine, reexamine, and reexamine. If we find tuberculosis early, we not only save lives, but health, waste of time, money, and suffering and will do much toward stopping the spread of this disease.

**TUBERCULOUS EMPYEMA—(Continued from page 17).**

to overcome their empyemas. One of these was treated with formalin and glycerine and the other was treated with alcohol. In two cases treated with alcohol the empyemas subsequently returned. One of these, in other hands, was treated by open drainage which later necessitated exten-

sive surgery. The patient is now well. The second case developed a broncho-pleural fistula which also necessitated extensive surgery to eliminate the empyema pocket and close the fistula. I might say it so happened that these cases were all cases without mixed infection.

**NEW YEAR RESOLUTIONS**

*Resolved:* to assist in the further decline of the death rate from tuberculosis.

*Resolved:* to make earlier diagnosis of tuberculosis and to examine every contact.

*Resolved:* to insist on the segregation of the open case of tuberculosis.

*Resolved:* to subscribe to the publication "DISEASES OF THE CHEST" so as to assist in carrying forward this program. M.K.

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**SURGICAL COLLAPSE OF THE LUNG—(Continued from page 14).**

and 48 hours after the operation may help to prevent anoxemia of the patient.

The time of the operation should be chosen according to the ability of the patient to produce his sputum, taking place in the afternoon, if necessary. The posture of the patient during surgery is perhaps not as important as we have been led to believe, and whether the patient is operated on sitting up or lying down depends on the individual preference of the surgeon.

Extra-pleural thoracoplasty under local anaesthesia has, in most communities, been abandoned since the demonstration by Dr. Matson that novocaine containing dyes injected into the proximity of the intercostal nerve, 6 cm. from the mid-vertebral line, may pass along the perineural nerve space for some distance from the point of injection. In discussions we have found dye substances in the sheath of the rami communicants extending to the sympathetic ganglia and also to the spinal dura. Thus, it is easy to understand that the toxic symptoms of novocaine, instead of being due to the hypersensitivity of the patient, may be caused by the rapid absorption of the anaesthetic by the spinal dura, or by its absorption into the sympathetic ganglia. Therefore general anaesthesia has almost entirely replaced the use of local anaesthesia and the use of general anaesthesia preceded by a hypnotic that is not particularly depressing to the respiratory system.

Ethylene seems to give less lung irritation, and, because of the high percentage of oxygen, the amount of anoxemia is considerably decreased.

The choice of the first stage is a matter of preference, and perhaps the greatest area of activity should be attacked first. The danger of aspiration into the lower lobe when the upper stage of thoracoplasty has been done perhaps has been exaggerated. To restore the shoulder function, active and passive movements should begin a few days after the operation. Postural rest on the side of the operation should be carried out as soon as possible to improve the collapse of the chest wall. The patient is placed in an adjustable hammock two or three days post-operative. This not only increases the amount of collapse, but aids in the prevention of scoliosis toward the operated side, and consequently prevents elevation of the shoulder on the side of operation.

*Conclusion.*

The number of cases that should be treated by operative collapse therapy is higher than one would suppose. If operative collapse procedures were utilized to the extent indicated many otherwise hopeless cases of pulmonary tuberculosis would be rehabilitated while a constant source of infection would be removed from society.

*Reading time of papers in Diseases of the Chest, 5 to 15 minutes.*



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## Should we Continue the Examination of Children for Tuberculosis?

SURPRISING as it may seem to many of us, the real value of an extensive diagnosis campaign among children has been questioned, and this by a physician of several years experience in the general practice of medicine. He calls attention to the fact that in studying Roentgenograms of adults, about forty per cent of the plates show old healed and calcified lymph nodes about the hiluses, and that in these individuals no diagnosis was made in childhood, no treatment was instituted, the usual life of the average child was experienced, and yet these individuals apparently overcame the childhood infection, and have experienced no apparent inconvenience from it. In his opinion, this was sound logic to prove that to make a diagnosis of tuberculosis in children while the disease was still of the childhood type and, therefore, confined largely to the lymph glands, was of little value.

To many of us such an opinion and such reasoning are preposterous, but to our friend the reasoning seemed sound and the conclusion a fact. Presuming that there may be others who concur in this opinion, we feel that it may be well to enumerate some of the benefits which result from an extensive diagnosis campaign among children.

1. As to the child. It is undoubtedly true that many children do have the childhood type of tuberculosis without ever having any inconvenience from it, but, on the other hand, a large per cent suffer the contrary experience. In some, especially if the glandular involvement is extensive, there is a caseation and spread to the lung itself, becoming the adult type, which, as we well know, is usually fatal in young children. The same result follows in children in whom there is apparently a natural low resistance to tuberculosis.

BY  
R. B. HOMAN, SR., M.D.  
El Paso, Texas

In many others, the disease may be quite well under control until the child reaches his teens when he is going through that trying stage of development, which makes unusual demands upon the physical strength. In addition, he is assuming the added burdens of high school and college, as well as many social demands, all of which contribute to so lowering the resistance that active tuberculosis of the lung results. We all know the difficulties encountered in overcoming the disease during that stage in life.

So while it is true that some of those who receive the infection in childhood escape further inconvenience from the infection, no doubt many more would do so if the diagnosis were made at the proper time and the child have the supervision and care which it should have.

2. To the community. It is a well known axiom that every case of tuberculosis comes from another case. It is a very difficult matter to find the other case in the average community with our ordinary methods of investigation.

In most diagnostic campaigns among school children and other groups, the finding of tuberculous children has been the means of locating many heretofore unknown open cases of tuberculosis in the community. With the institution of proper sanitary measures, the further spread of the disease from such open cases is avoided, thus making the campaign of great value to the community.

In this age of preventive medicine, let us not question any measure which, even in a small way, provides a means for reducing the source of infection in any of our infectious and contagious diseases.

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